



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Docket No: Q53397

Ken-ichi TAKATORI, et al.

Appln. No.: 09/256,346

Group Art Unit: 2675

Confirmation No.: 9700

Examiner: A. Nelson

Filed: February 24, 1999

For: LIQUID CRYSTAL DISPLAY APPARATUS AND METHOD OF DRIVING THE
SAME

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SUBMISSION OF APPELLANT'S BRIEF ON APPEAL

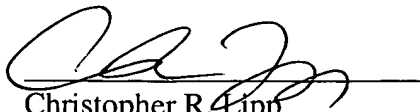
Commissioner for Patents
Washington, D.C. 20231

Sir:

Submitted herewith please find an original and two copies of Appellant's Brief on Appeal. A check for the statutory fee of \$320.00 is attached. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account. A duplicate copy of this paper is attached.

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PATENT TRADEMARK OFFICE

Date: January 6, 2003

Attorney Docket No.: Q53397



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APPELLANTS' BRIEF ON APPEAL UNDER 37 C.F.R. § 1.192

Commissioner for Patents
Washington, D.C. 20231

Sir:

This is an Appeal from the final rejection of June 4, 2002 (Paper No. 16) of claims 1-19
in Application No. 09/256,346. In accordance with the provisions of 37 C.F.R. § 1.192,
Appellant submits the following:

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is NEC Corporation. Assignment of the
application was submitted to the U.S. Patent and Trademark Office on May 17, 1999, and
recorded on the same date at Reel 9957, Frame 0023.

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II. RELATED APPEALS AND INTERFERENCES

There are no known appeals or interferences that will affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-19 are pending in the application with claims 1, 10, 11 and 16-19 being in independent form. As set forth in the Office Action dated April 11, 2002, claims 1, 8, 10, 11 and 16-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada et al. (USP 4,800,382) in view of Applicant's admitted prior art. Claims 2 and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada et al. in view of Applicant's admitted prior art and Kurematsu (USP 5,796,380). Claims 3-5 and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada et al. in view of Applicant's admitted prior art, Bonnett et al. (USP 6,075,506) and Kurematsu. Claims 6 and 8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada et al. in view of Applicant's admitted prior art, Kurematsu and Kamiya et al. (USP 4,694,348). Claims 7, 9 and 12-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada et al. in view of Applicant's admitted prior art and Kamiya et al. All of the rejected claims are set forth in the attached Appendix.

IV. STATUS OF AMENDMENTS

No claim amendments were requested subsequent to the Office Action of June 4, 2002.

V. SUMMARY OF THE INVENTION

The present invention is directed to a method of driving a liquid crystal display apparatus.

In accordance with a first embodiment of the present invention shown in Figure 10, during a first field of a frame for display, scan lines of a liquid crystal are successively selected and data therefor are written during a write period 101, display is provided during a display period 102, and all of the scan lines are reset during a reset period 103. Subsequently, during a second field of the frame for display, the process is repeated with the sequence or order in which the scan lines are scanned in the second field of the frame being different from that in the first field of the frame. That is, the scanning order of scan lines in the second field (bottom to top) is opposite or reverse of the scanning order of scan lines in the first field (top to bottom). (page 30, lines 4-17).

In accordance with a second embodiment of the present invention shown in Figure 12, during the first field, the odd-numbered scan lines are successively scanned from top to bottom and then the even-numbered scan lines are simultaneously reset. During the second field, the even-numbered scan lines are successively scanned from bottom to top and then the odd-numbered scan lines are simultaneously reset. (page 33, line 17 - page 34, line 21).

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In accordance with a third embodiment of the present invention shown in Figure 14, during the first field, the odd-numbered scan lines are successively scanned, the even-numbered scan lines are simultaneously reset, the even-numbered scan lines are successively scanned in an order reverse to the scanning of odd-numbered scan lines, and the odd-numbered scan lines are simultaneously reset. During the second field, the odd-numbered scan lines are successively scanned, the even-numbered scan lines are simultaneously reset, the even-numbered scan lines are successively scanned in an order reverse to the odd-numbered scan lines successively scanned in the second field, and the odd-numbered scan lines are simultaneously reset. (page 37, line 4 - page 38, line 1).

In accordance with a fourth embodiment of the present invention shown in Figure 16, during the first field, the odd-numbered scan lines are successively scanned, the even-numbered scan lines are simultaneously reset, the even-numbered scan lines are successively scanned, and the odd-numbered scan lines are simultaneously reset. During a second field, the odd-numbered scan lines are successively scanned in an order reverse to an order of scanning of the odd-numbered scan lines in the first field, the even-numbered scan lines are simultaneously reset, the even-numbered scan lines are successively scanned in an order reverse to an order of scanning of the even-numbered scan lines in the first field, and the odd-numbered scan lines are simultaneously reset. (page 40, line 18 - page 41, line 22).

In accordance with a fifth embodiment of the present invention shown in Figure 17, during the first field, the odd-numbered scan lines are successively scanned, the even-numbered

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scan lines simultaneously reset, the even-numbered scan lines are successively scanned in an order reverse to the odd-numbered scan lines successively scanned in the first field, and the odd-numbered scan lines are simultaneously reset. During the second field, the odd-numbered scan lines successively scanned in an order reverse to the odd-numbered scan lines successively scanned in the first field, the even-numbered scan lines are simultaneously reset, the even-numbered scan lines are successively scanned in an order reverse to the even-numbered scan lines successively scanned in the first field, and the odd-numbered scan lines simultaneously reset. (page 44, line 13 - page 45, line 17).

In accordance with another embodiment of the present invention shown in Figures 24-25, scan lines are successively scanned from the top, operation of writing a positive data signal is repeated a plurality of times (four) to form a first field of a frame, and then while the scan lines are successively scanned from the top, operation of writing a negative data signal is repeated a plurality of times (four) to complete a second field of the frame. In other words, data is written a plurality of times in each scan line during the first field by use of a predetermined signal voltage, and data written a plurality of times in each scan line in the second field by use of a signal voltage having a polarity which is opposite to a polarity of the predetermined signal voltage. (page 69, line 2 - page 70, line 11).

In accordance with yet another embodiment of the present invention shown in Figures 26 and 27, during a first field and a third field of a frame a positive data signal is written while the scan lines are successively scanned from the top down, and during a second field and fourth field

of the frame a negative data signal is written while the scan lines are successively scanned from the top down. In other words, data is written a plurality of times in a frame by use of a signal voltage having a polarity which becomes alternately positive and negative a plurality of times during the frame at a predetermined frequency, wherein the data is written each time the polarity of the signal voltage is positive and each time the polarity of the signal voltage is negative.
(page 70, line 22 - page 71, line 10).

VI. ISSUES

Whether independent claims 1, 10, 11 and 16-19 were erroneously rejected under 35 U.S.C. § 103(a) as being unpatentable over Okada in view of Applicant's admitted prior art?

VII. GROUPING OF CLAIMS

The claims of the present application may properly be considered in three groups that are separately patentable and therefore do not stand or fall together.

The proper grouping of the claims is as follows:

Group 1: Independent claim 1 and dependent claims 2-8 stand or fall together.

Group 2: Independent claims 10 and 11 and dependent claim 12-15 stand or fall together.

Group 3: Independent claims 16-19 stand or fall together.

VIII. ARGUMENTS

As an initial matter, Appellant acknowledges that all of the claims relate a method of driving a liquid crystal display apparatus. However, as set forth below, each group recites a different method of scanning the scan lines during the fields of a frame for display.

Group 1: Independent claim 1 and dependent claims 2-8 stand or fall together as they recite scanning successively a plurality of scan lines in a first field of a frame for display and scanning successively the scan lines in a second field of the frame for display in an order reverse to that in the first field.

Group 2: Independent claims 10 and 11 and dependent claim 12-15 stand or fall together as they recite writing data a plurality of times in a scan line in a frame.

Group 3: Independent claims 16-19 stand or fall together as they recite successively scanning the odd-numbered scan lines and successively scanning the even-numbered scan lines in different orders in the same field or different fields of a frame.

Accordingly, the claims in **Groups 1-3** are believed to be separately patentable because of the limitations therein, and therefore they do not stand and fall together.

A. Claims 1-8 (Group 1) are Patentable Over the Prior Art.

Independent claim 1 recites a method for driving a liquid crystal display apparatus comprising the steps of: scanning successively a plurality of scan lines in a first field of a frame

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for display; simultaneously resetting the scan lines in the first field after the scan lines are successively scanned in the first field; scanning successively the scan lines in a second field of the frame for display in an order reverse to that in the first field; and simultaneously resetting the scan lines in the second field after the scan lines are successively scanned in the second field. The method of claim 1 is illustrated in Figure 10 of the present application.

Appellant respectfully submits that claim 1 would not have been rendered obvious in view of Okada and Applicant's admitted prior art because Applicant's admitted prior art does not teach or suggest scanning successively the scan lines in a second field of a frame for display in an order reverse to that in the first field, as claimed.

The Examiner (pages 2 and 3 of the Final Office Action dated June 4, 2002) maintains that Okada discloses all of the features of independent claim 1 except that "the scan lines are successively scanned in a second field in an order reverse to that in the first field", which the Examiner asserts is disclosed by Applicant's admitted prior art (Figure 7). Further, the Examiner (page 7 of the Final Office Action dated June 4, 2002) asserts that "the change in polarity from the first field to the second field, as taught by the admitted prior art, could be read as an 'order reverse'. Therefore[,] the admitted prior art does teach scanning successively the scan lines in a second field of a frame in a order reverse to that in the first field."

Appellant respectfully submits that the Examiner's position is incorrect since scanning successively the scan lines from top to bottom in a first field while applying a positive data voltage and then successively scanning the scan lines from top to bottom in a second field while

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applying a negative data voltage (as disclosed by admitted prior art Figure 7) can not be reasonably interpreted by any standard to correspond to scanning successively the scan lines in first field and then scanning successively the scan lines in a second field in an order reverse to that in the first field. That is, scanning the scan lines while applying a positive or negative data voltage is not related or relevant to the order in which the scan lines are successively scanned. As discussed in the specification at page 11, admitted prior art Figure 7 simply shows that positive writing is performed over four fields during a positive data voltage period and then negative writing is performed over four fields of negative data voltage period, wherein the scan lines are successively scanned in the same order (from top to bottom) in each of the fields of the positive and negative data voltage periods.

Accordingly, Appellant respectfully submits that it is quite clear that Applicant's admitted prior art, as well as Okada, does not teach or suggest scanning successively the scan lines in a second field of a frame for display in an order reverse to that in the first field, as recited in claim 1. Thus, independent claim 1, as well as dependent claims 2-9, should be allowable because the combined references, do not teach or suggest all of the features of the claims.

B. Claims 10-15 (Group 2) are Patentable Over the Prior Art.

Independent claim 10 recites a method for driving a liquid crystal display element in a frame composed of a first field and a second field comprising the steps of (a) writing data a plurality of times in the first field by use of a predetermined signal voltage; and (b) writing data a

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plurality of times in the second field by use of a signal voltage whose polarity is opposite to that of the predetermined signal voltage. The method of claim 10 is illustrated in Figures 24 and 25 of the present application.

Appellant respectfully submits that the claim 10 would not have been rendered obvious in view of Okada and Applicant's admitted prior art because the combined references do not teach or suggest writing data a plurality of times in a scan line in the first field (i.e., a single field) by use of a predetermined signal voltage and writing data a plurality of times in a scan line in the second field (i.e., a single field) by use of a signal voltage whose polarity is opposite to that of the predetermined signal voltage, as claimed.

The Examiner (pages 2, 3 and 7 of the Final Office Action dated June 4, 2002) maintains that Okada discloses all of the features of independent claim 10 except "writing data a plurality of times to each of the scan lines", which the Examiner asserts is disclosed by Applicant's admitted prior art (Figures 6 and 7). The Examiner asserts that "[the admitted prior art discloses] data is written four times in each scan line, and the admitted prior art [Figure 7] does teach writing data a plurality of times to each of scan lines."¹ While Appellant agrees with this statement by the Examiner, Applicant respectfully submits that it is quite clear that Applicant's

¹ On page 7 of the Office Action dated June 4, the Examiner incorrectly characterizes Appellant's argument as being "the applied art fails to teach or suggest writing data a plurality of time to each of the scans lines." However, Appellant argues the applied art fails to teach or suggest writing data a plurality of times to a scan line a plurality of times in single field (i.e., writing data a plurality of times in the scan line in the first field and writing data a plurality of times in the scan line in the second field).

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admitted prior art Figure 7 does not teach or suggest “writing data a plurality of times in the scan line in the first field ... and writing data a plurality of times in the scan line in the second field”, as recited in claim 10.

Applicant's admitted prior art Figure 7 shows that positive writing is performed over four fields during a positive data voltage period and then negative writing is performed over four fields of a negative data voltage period (i.e., the positive data voltage period and the negative data voltage period each include four fields), wherein in each of the four fields data is successively written only one time to each of the scan lines starting with the top scan line. Thus, while data is written four times in each scan line in the positive and negative data voltage periods, data is only written one time in per scan line in each of the four fields of the positive and negative data voltage periods.

Accordingly, Appellant respectfully submits claim 10 should be allowable because the combined references do not teach or suggest writing data a plurality of times in a (single) scan line in the first field by use of a predetermined signal voltage and writing data a plurality of times in (single) scan line in the second field by use of a signal voltage whose polarity is opposite to that of the predetermined signal voltage, as recited in claim 10.

Independent claim 11 recites, in part, a method for driving a liquid crystal display element comprising writing data a plurality of times in a frame by use of a signal voltage whose polarity becomes alternately positive and negative a plurality of times during the frame at a predetermined frequency. The method of claim 11 is illustrated in Figures 26 and 27 of the

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present application. Although the Examiner does not appear to specifically address the subject matter of independent claim 11 in support of the rejection, Appellant respectfully submits that it is quite clear that neither Okada nor Applicant's admitted prior art teaches or suggests the subject matter of claim 11. Rather, Okada discloses writing once in black (i.e., a positive pulse) then writing once in white (i.e., a negative pulse) during one frame. Further, Applicant's admitted prior art Figure 7 discloses positive writing is performed successively over four fields during a positive data voltage period and then negative writing is performed successively over four fields of a negative data voltage period. That is, Applicant's admitted prior art Figure 7 merely discloses writing data a plurality of times in a frame by use of signal voltage whose polarity becomes positive for one time period and then negative for one time period during the frame rather than writing data a plurality of times in a frame by use of a signal voltage whose polarity becomes alternately positive and negative a plurality of times during the frame at a predetermined frequency, as claimed.

Accordingly, Appellant respectfully submits that independent claims 10 and 11, as well as dependent claims 12-15, should be allowable because the applied references, alone or combined, do not teach or suggest all of the features of the claims.

C. Claims 16-19 (Group 3) are Patentable Over the Prior Art.

With regards to independent claims 16-19, Appellant respectfully submits that that neither Okada nor Applicant's admitted prior art teaches or suggests the subject matter of claims 16-19 (which is illustrated in Figures 12, 14, 16 and 17, respectively).

In support of the rejection of independent claims 16-19, the Examiner (page 3 of the Office Action dated June 4) simply states "scanning odd-numbered scan lines in a first frame and scanning even-numbered scan lines in the next frame is well know in the conventional art." However, the characterization of certain limitations or parameters as obvious does not make the claimed invention, considered as a whole, obvious. It is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). This burden can only be satisfied by an objective teaching in the prior art or by cogent reasoning that the knowledge is available to one of ordinary skill in the art. See In re Lulu, (747 F.2d 703, 223 U.S.P.Q. 1257 (Fed. Cir. 1984)). Furthermore, if the Examiner is attempting to rely on official or judicial notice for this feature, Appellant notes that it has been established that the Examiner may not rely on official or judicial notice at the exact point where patentable novelty is argued, but must come forward with pertinent prior art. See Ex parte Cady, 148 U.S.P.Q. 162 (Pat. Off. Bd. App. and Inter. 1965).

Moreover, similar to independent claim 1 discussed above, Appellant respectfully submits that it is quite clear the neither Okada nor Applicant's admitted prior art disclose any of the claimed method steps of claims 16-19 including alternately scanning successively odd-

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numbered and even-numbered scan lines, scanning successively odd-numbered and even-numbered scan lines in orders reverse to each other, or scanning successively odd-numbered and even-numbered scan lines in different orders in the same field or different fields.

With regards to claim 16, the combined references do not teach or suggest scanning successively the even-numbered scan lines in a second field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in a first field, as claimed.

With regards to claim 17, the combined references do not teach or suggest scanning successively the even-numbered scan lines in a field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in the field, as claimed.

With regards to claim 18, the combined references do not teach or suggest scanning successively the odd-numbered and even-numbered scan lines in a second field of the frame for display in an order reverse to an order of scanning of the odd-numbered and even-numbered scan lines in the first field, as claimed.

With regards to claim 19, the combined references do not teach or suggest scanning successively the even-numbered scan lines in the first field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in the first field, scanning successively the odd-numbered scan lines in a second field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in the first field, and scanning successively the even-numbered scan lines in the second field of the frame for display in an order reverse to the even-numbered scan lines successively scanned in the first field, as claimed.

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Accordingly, Appellant respectfully submits that independent claims 16-19 should be allowable because the applied references, alone or combined, do not teach or suggest all of the features of the claims.

The present Brief on Appeal is being filed in triplicate. Unless a check is submitted herewith for the fee required under 37 C.F.R. §1.192(a) and 1.17(c), please charge said fee to Deposit Account No. 19-4880.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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23373

PATENT TRADEMARK OFFICE

Date: January 6, 2003

Attorney Docket No.: Q53397

APPENDIX

CLAIMS 1-19 ON APPEAL:

1. (Amended) A method for driving a liquid crystal display apparatus comprising the steps of:

scanning successively a plurality of scan lines in a first field of a frame for display;
simultaneously resetting the scan lines in the first field after the scan lines are successively scanned in the first field;
scanning successively the scan lines in a second field of the frame for display in an order reverse to that in the first field; and
simultaneously resetting the scan lines in the second field after the scan lines are successively scanned in the second field.

2. The method for driving the liquid crystal display apparatus as defined in Claim 1, wherein the first and second fields constitute one frame in interlace drive.

3. The method for driving the liquid crystal display apparatus as defined in Claim 2 wherein two write periods are provided for each scan line.

4. The method for driving the liquid crystal display apparatus as defined in Claim 3 wherein two reset periods are provided for each scan line.

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5. The method for driving the liquid crystal display apparatus as defined in Claim 3 wherein in each frame a single reset period is provided for each scan line, and a data signal voltage used in a first writing operation after the reset has an absolute value smaller than that of a data signal voltage used in a second writing operation.

6. A method for driving a field-sequential liquid crystal display apparatus wherein data corresponding to three colors are successively displayed, and the drive for each color is performed by the method of Claim 5.

7. A method for driving a field-sequential liquid crystal display apparatus in which data corresponding to three colors are successively displayed, and the drive for each color is performed by the method of Claim 1.

8. A liquid crystal display apparatus characterized by comprising liquid crystal driven by the method according to any one of claims 1-5.

9. A liquid crystal display apparatus comprising liquid crystal driven by the method according to Claim 6 or 7.

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10. (Amended) A method for driving a liquid crystal display element forming a scan line in a frame composed of a first field and a second field, the method comprising the steps of:
writing data a plurality of times in the scan line in the first field by use of a predetermined signal voltage; and
writing data a plurality of times in the scan line in the second field by use of a signal voltage having a polarity which is opposite to a polarity of the predetermined signal voltage.

11. (Twice Amended) A method for driving a liquid crystal display element forming a scan line, the method comprising writing data a plurality of times in a frame by use of a signal voltage having a polarity which becomes alternately positive and negative a plurality of times during the frame at a predetermined frequency, wherein the data is written each time the polarity of the signal voltage is positive and each time the polarity of the signal voltage is negative.

12. A method for driving a liquid crystal display element according to Claim 10 or 11, wherein a group of scan lines are divided into a plurality of blocks, and the plurality of blocks are scanned simultaneously.

13. A method for driving a field-sequential liquid crystal display apparatus in which each frame is divided into three fields corresponding to three colors and data are successively

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displayed within each field, wherein the drive for each color is performed by the method for a liquid crystal display element according to Claim 12.

14. A liquid crystal display apparatus as defined in Claim 10 wherein the liquid crystal display element of the liquid crystal display apparatus is driven by the method for driving a liquid crystal display element according to any one of Claims 10-12.

15. A field-sequential liquid crystal color display apparatus in which data corresponding to three colors are successively displayed, wherein the apparatus is driven by the method for a liquid crystal display element according to Claim 13.

16. A method for driving a plurality of scan lines of a liquid crystal display apparatus, the method comprising the steps of:

scanning successively odd-numbered scan lines in a first field of a frame for display;
simultaneously resetting even-numbered scan lines in the first field after the odd-numbered scan lines are successively scanned in the first field;

scanning successively the even-numbered scan lines in a second field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in the first field;
and

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simultaneously resetting the odd-numbered scan lines in the second field after the even-numbered scan lines are successively scanned in the second field.

17. A method for driving a plurality of scan lines of a liquid crystal display apparatus, the method comprising the steps of:

scanning successively odd-numbered scan lines in a first field of a frame for display;
simultaneously resetting even-numbered scan lines in the first field after the odd-numbered scan lines are successively scanned in the first field;

scanning successively the even-numbered scan lines in the first field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in the first field;

simultaneously resetting the odd-numbered scan lines in the first field after the even-numbered scan lines are successively scanned in the first field;

scanning successively the odd-numbered scan lines in a second field of the frame for display;

simultaneously resetting the even-numbered scan lines in the second field after the odd-numbered scan lines are successively scanned in the second field;

scanning successively the even-numbered scan lines in the second field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in the second field;

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simultaneously resetting the odd-numbered scan lines in the second field after the even-numbered scan lines are successively scanned in the second field.

18. A method for driving a plurality of scan lines of a liquid crystal display apparatus, the method comprising the steps of:

scanning successively odd-numbered scan lines in a first field of a frame for display;
simultaneously resetting even-numbered scan lines in the first field after the odd-numbered scan lines are successively scanned in the first field;

scanning successively the even-numbered scan lines in the first field of the frame for display;

simultaneously resetting the odd-numbered scan lines in the first field after the even-numbered scan lines are successively scanned in the first field;

scanning successively the odd-numbered scan lines in a second field of the frame for display in an order reverse to an order of scanning of the odd-numbered scan lines in the first field;

simultaneously resetting the even-numbered scan lines in the second field after the odd-numbered scan lines are successively scanned in the second field;

scanning successively the even-numbered scan lines in the second field of the frame for display in an order reverse to an order of scanning of the even-numbered scan lines in the first field;

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simultaneously resetting the odd-numbered scan lines in the second field after the even-numbered scan lines are successively scanned in the second field.

19. A method for driving a plurality of scan lines of a liquid crystal display apparatus, the method comprising the steps of:

scanning successively odd-numbered scan lines in a first field of a frame for display;
simultaneously resetting even-numbered scan lines in the first field after the odd-numbered scan lines are successively scanned in the first field;

scanning successively the even-numbered scan lines in the first field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in the first field;

simultaneously resetting the odd-numbered scan lines in the first field after the even-numbered scan lines are successively scanned in the first field;

scanning successively the odd-numbered scan lines in a second field of the frame for display in an order reverse to the odd-numbered scan lines successively scanned in the first field;

simultaneously resetting the even-numbered scan lines in the second field after the odd-numbered scan lines are successively scanned in the second field;

scanning successively the even-numbered scan lines in the second field of the frame for display in an order reverse to the even-numbered scan lines successively scanned in the first field;

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simultaneously resetting the odd-numbered scan lines in the second field after the even-numbered scan lines are successively scanned in the second field.